

WHAT WE CLAIM IS:

Sub A1 1. A fuel blend for use in an internal combustion engine, the fuel blend comprising:

a hydrocarbon-containing fuel component;

5 an oxygen-containing component capable of providing oxygen for combustion of the fuel component under conditions prevailing during the combustion cycle of the internal combustion engine;

wherein the major oxygen-providing agent of the oxygen-containing component is one or more compounds having the general formula (I):

10



wherein R_1 is selected from hydrogen, lower alkyl, lower alkenyl and lower alkynyl groups;

15

R_2 is selected from lower alkyl, lower alkenyl and lower alkynyl groups, or a group having the general formula (II):



20

wherein R_3 is selected from lower alkyl, lower alkenyl and lower alkynyl groups; and

R_4 is selected from lower alkyl groups.

2. A fuel blend as claimed in claim 1, wherein R_1 is selected from hydrogen, C_1 or C_2 alkyl, C_2 alkenyl and C_2 alkynyl groups.

3. A fuel blend as claimed in claim 2, wherein R_1 is selected from hydrogen, C_1 or C_2 alkyl.

4. A fuel blend as claimed in claim 3, wherein R₁ is methyl.
5. A fuel blend as claimed in claim 3, wherein R₁ is ethyl.
- 5 6. A fuel blend as claimed in claim 1, wherein R₂ is selected from C₁ to C₄ alkyl, C₂ alkenyl and C₂ alkynyl groups.
7. A fuel blend as claimed in claim 6, wherein R₂ is C₁ or C₂ alkyl.
- 10 8. A fuel blend as claimed in claim 7, wherein R₂ is methyl.
9. A fuel blend as claimed in claim 7, wherein R₂ is ethyl.
- 10 15. A fuel blend as claimed in claim 1, wherein the compound of general formula (I) is methyl acetate.
11. A fuel blend as claimed in claim 1, wherein the compound of general formula (I) is ethyl acetate.
12. A fuel blend as claimed in claim 1, wherein the compound of general formula (I) is methyl formate.
13. A fuel blend as claimed in claim 1, wherein the compound of general formula (I) is ethyl formate.
- 25 14. A fuel blend as claimed in claim 1, wherein the compound of general formula (I) is tertiary butyl acetate.

*Sub
B1
cnt.*

15. A fuel blend as claimed in claim 1, wherein R₂ is a group of general formula (II), in which R₃ is a C₁ to C₄ alkyl.

16. A fuel blend as claimed in claim 15, wherein R₄ is a C₁ to C₄ alkyl.

Sub A2

17. A fuel blend as claimed in claim 14, wherein R₃ and R₄ are each independently selected from C₁ or C₂ alkyl.

18. A fuel blend as claimed in claim 1 in which the compound of general formula (I) is ethylene glycol diacetate.

19. A fuel blend as claimed in claim 1, wherein the hydrocarbon-containing fuel component is selected from the group consisting of diesel and gasoline.

15 20. A fuel blend as claimed in claim 1, wherein the major oxygen-providing component comprises a first compound of formula (I), in which R₂ is ethyl, and a second compound of formula (I), in which R₂ is methyl.

20 21. A fuel blend as claimed in claim 20, wherein both the first and second compounds are compounds in which R₁ is a C₁ to C₄ alkyl.

22. A fuel blend as claimed in claim 21, wherein the first compound and the second compound are present in a ratio of from 1:5 to 5:1.

25 23. A fuel blend as claimed in claim 21, wherein the first compound and the second compound are present in a ratio of from 1:1 to 1:1.5.

24. A fuel blend as claimed in claim 23, wherein the first compound is methyl acetate and the second compound is ethyl acetate.

25. A fuel blend as claimed in claim 1, wherein the major oxygen-providing component comprises a first compound of formula (I), in which R₂ is a group of general formula (II), and a second compound of formula (I), in which R₂ is a C₁ to C₄ alkyl.

5

*Sub b1
C1*
26. A fuel blend as claimed in claim 25, wherein the first compound is a compound in which R₁ is a C₁ to C₄ alkyl.

10

27. A fuel blend as claimed in claim 26, wherein the second compound is a compound in which R₁ is a C₁ to C₄ alkyl.

28. A fuel blend as claimed in claim 27, wherein the first compound is ethylene glycol diacetate.

15

29. A fuel blend as claimed in claim 28, wherein the second compound is selected from methyl acetate, ethyl acetate and mixtures thereof.

30. A fuel blend as claimed in claim 25, wherein the first compound and second compound are present in a ratio of from 0.5:1 to 10:1.

20

31. A fuel blend as claimed in claim 30, wherein the first compound and second compound are present in a ratio of from 1:1 to 5:1.

25

32. A fuel blend as claimed in claim 1, further comprising a stabilizer.

33. A fuel blend as claimed in claim 32, wherein the stabilizer is selected from alcohols having from 1 to 8 carbon atoms.

34. A fuel blend as claimed in claim 33, wherein the stabilizer is selected from alcohols having from 2 to 5 carbon atoms.

35. A fuel blend as claimed in claim 34, wherein the stabilizer is ethanol.

36. A fuel blend as claimed in claim 32, wherein the compound of general formula (I) and the stabilizer are present in a ratio of from 20:1 to 150:1.

37. A fuel blend as claimed in claim 36, wherein the compound of general formula (I) and the stabilizer are present in a ratio of from 75:1 to 125:1.

38. A fuel blend as claimed in claim 1, further comprising an alcohol having from 2 to 5 carbon atoms and bearing one or more alkyl substituents.

39. A fuel blend as claimed in claim 38, wherein the alcohol is an alkyl substituted butyl alcohol.

40. A fuel blend as claimed in claim 39, wherein the alcohol is tertiary butyl alcohol.

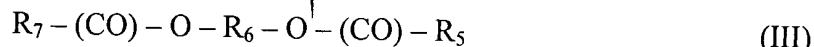
41. A fuel blend as claimed in claim 38, wherein the alcohol and the compound of general formula (I) are present in a ratio of from 1:0.6 to 1:5.

42. A fuel blend as claimed in claim 1, further comprising a biocide.

43. A fuel blend as claimed in claim 1, wherein the hydrocarbon-containing fuel component is gasoline and the compound of general formula (I) is present in an amount sufficient to provide an oxygen-content in the fuel blend of 1 to 5 percent by weight.

44. A fuel blend as claimed in claim 1, wherein the hydrocarbon-containing fuel component is diesel and the compound of general formula (I) is present in an amount sufficient to provide an oxygen-content in the fuel blend of 1 to 10 percent by weight.

5 45. An oxygenating additive for a hydrocarbon-containing fuel comprising:
a first compound having a general formula (III):

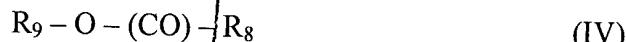


wherein R₅ is selected from lower alkyl, lower alkenyl and lower alkynyl groups; R₆ is selected from lower alkyl; and

wherein R₇ is selected from lower alkyl, lower alkenyl and lower alkynyl groups:

and

a second compound having a general formula (IV):



wherein R₈ is selected from hydrogen, lower alkyl, lower alkenyl and lower alkynyl groups; and

R₉ is selected from lower alkyl, lower alkenyl and lower alkynyl groups

46. An oxygenating additive as claimed in claim 45, wherein R₅ is selected from C₁ to C₄ alkyl.

25 47. An oxygenating additive as claimed in claim 46, wherein R₅ is methyl

48. An oxygenating additive as claimed in claim 45, wherein R₄ is ethyl

Sub
B'

- b
b/
nt.

10 5. 49. An oxygenating additive as claimed in claim 45, wherein R₇ is selected from C₁ to C₄ alkyl.

10 5. 50. An oxygenating additive as claimed in claim 49, wherein R₇ is methyl.

10 5. 51. An oxygenating additive as claimed in claim 45, wherein the compound of general formula (III) is ethylene glycol diacetate.

10 5. 52. An oxygenating additive as claimed in claim 45, wherein R₈ is selected from hydrogen, and C₁ to C₄ alkyl.

15 5. 53. An oxygenating additive as claimed in claim 52, wherein R₈ is methyl.

15 5. 54. An oxygenating additive as claimed in claim 45, wherein R₉ is selected from C₁ to C₄ alkyl.

20 5. 55. An oxygenating additive as claimed in claim 54, wherein R₉ is selected from methyl and ethyl.

20 5. 56. An oxygenating additive as claimed in claim 45, wherein the compound of general formula (IV) is selected from methyl acetate and ethyl acetate and mixtures thereof.

25 5. 57. An oxygenating additive as claimed in claim 45, wherein the compound of general formula (III) and the compound of general formula (IV) are present in a ratio of from 0.5:1 to 5:1.

*Santa
B1
cont.*

58. An oxygenating additive as claimed in claim 57, wherein the compound of general formula (III) and the compound of general formula (IV) are present in a ratio of from 1:1 to 2.5:1.

- 5 59. An oxygenating additive as claimed in claim 45, further comprising a biocide.
60. An oxygenating additive as claimed in claim 45, further comprising a stabilizer.
- 10 61. An oxygenating additive as claimed in claim 60, wherein the stabilizer is selected from alcohols having from 2 to 5 carbon atoms.
- 15 62. An oxygenating additive as claimed in claim 61, wherein the stabilizer is ethanol.
63. An oxygenating additive as claimed in claim 60, wherein the ratio of the combined amounts of the compounds of general formulae (III) and (IV) to the stabilizer is from 20:1 to 150:1.
- 20 64. An oxygenating additive as claimed in claim 63, wherein the ratio of the combined amounts of the compounds of general formulae (III) and (IV) to the stabilizer is from 75:1 to 125:1.

65. An oxygenating additive for a hydrocarbon fuel comprising a first and a second compound, both the first and the second compounds having the general formula (I):

25



wherein R_1 in each of the first and the second compound is independently selected from hydrogen, lower alkyl, lower alkenyl and lower alkynyl groups; and

R_2 in each of the first and second compound is independently selected from lower alkyl, lower alkenyl and lower alkynyl groups.

- 5 66. An oxygenating additive as claimed in claim 65, wherein R₁ and R₂ in each of
the first and second compounds are both independently selected from hydrogen, and
lower alkyl groups.

0 67. An oxygenating additive as claimed in claim 66, wherein the first compound is
methyl acetate and the second compound is ethyl acetate.

0 68. An oxygenating additive as claimed in claim 67, wherein methyl acetate and
ethyl acetate are present in a ratio of from 1:2 to 2:1.

0 69. An oxygenating additive as claimed in claim 68, wherein methyl acetate and
ethyl acetate are present in a ratio of 1:1.